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ABSTRACT

An integrated system of academic and vocational-technical education is vital to the well-being of students and the nation. Approaches to integrated programs include requiring more academic coursework of vocational students; including academic skills in vocational courses; and integrating the entire high school. Key activities for successful integration are curriculum and professional development supported by funding; strong leadership; involvement of both academic and vocational teachers; and enough time for restructuring the curriculum. The Maryland Vocational-Technical Education Commission recommends establishing an integrated system so that, by 2000, the dropout rate should be reduced to less than 1 percent and every student should graduate with a marketable skill, be technologically literate, and have an individual learning plan. A conceptual model of such a program would include a college preparatory program for college-bound students, articulated two-plus-two programs for students planning technical careers, and career entry programs for those planning employment after high school graduation. Barriers to integration are lack of well-established models; demands on teacher time; lack of resources, support, and assessment instruments; and lack of cognitive research findings. The Chicago High School for Agricultural Sciences countered arguments of lack of time in the school day by shortening lunch and eliminating study hall. Higher expectations motivated and challenged their lower ability students to succeed, rather than increasing their dropout rate. Efforts to integrate vocational and academic curricula can lead to a new role and new respect for vocational education. (SK)

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INTEGRATION OF ACADEMIC AND VOCATIONAL-TECHNICAL EDUCATION

VOC TECH NEWS

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MARYLAND STATE COUNCIL ON VOCATIONAL-TECHNICAL EDUCATION (SCOVE)

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STATE COUNCIL ON VOCATIONAL-TECHNICAL EDUCATION (SCOVE)

VOC TECH NEWS

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Integration of Academic and Vocational-Technical Education

Need for Integrated Programs

The State Council on Vocational-Technical Education firmly believes that vocational-technical education is an integral part of the educational process. All individuals should have equal access to vocational-technical education in accordance with their interests, needs, and abilities. Increasing support for this concept is currently being generated across the country by numerous authorities associated with the reauthorization of the Carl D. Perkins Vocational Education Act. Almost without exception such authorities are highlighting a vital need for integrating academic and vocational education.

Maryland school systems generally do not offer integrated academic and vocational-technical education programs. However, several schools are involved in approaches to integrating vocational and academic education such as offering applied courses in the mathematics, communications and the principles of technology that are designed to strengthen the basic skills of vocational students. **The Council believes the timely establishment of an integrated education system is vital to the continued economic well-being of the State.** As an initial step in this direction it is considered appropriate to establish a pilot program to integrate academic and vocational-technical education in a secondary school. This would provide a means of determining how academic and vocational education may be combined into a single system which would be responsive to the educational needs of all students enrolled. Such a program must be carefully developed and implemented as a coordinated effort by knowledgeable representatives of academic and vocational-technical education. This special edition of the "Voc Tech News" is designed to present background information and the views of various groups and individuals on the issue of integrating academic and vocational education.

Approaches to Integration

The National Center for Research in Vocational Education (NCRVE) has noted the following approaches to integrating vocational and academic education:

1. Requiring more academic coursework of vocational students, or establishing academic prerequisites before taking vocational sequences.
2. Including or reinforcing academic skills in existing vocational courses.
3. Using the "applied academic" curricula developed by the Center for Occupational Research and Development (CORD) and the Alliance for Instructional Technology (AIT).
4. Using new curricula designed locally. These again take many forms.
5. Integrating the entire high school. In some of our largest cities, one finds "specialized, career-oriented high schools" (not necessarily the same thing as magnet schools) that appear to have a number of excellent features. The specialization may be by industry (agriculture, aircraft, finance, health professions, apparel design, computer-controlled manufacturing technology, the hospitality industry, business services, various engineering specialties, such as materials science, or computer science and electrical, communications) or by subject (mathematics and different scientific disciplines). Most of the students in these schools take a full college-preparatory program and they also acquire high grade job skills at the same time. This combination requires longer-than-average school days, and, for many students, summer study as well. *Students who are graduated from these schools have options: four-year college, community college, technical institute, a job with good career prospects, or the combination of postsecondary education and work.*

(Source: NCRVE Testimony before Senate Subcommittee on Education, Arts, and Humanities, July 27, 1989.)

Elements to Assist Schools

The National Assessment of Vocational Education identified the following elements to assist schools in integrating academic and vocational coursework:

- "curriculum development and professional development are key activities in the integration of vocational and academic skills;
- both vocational and academic instructors should be involved from

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the start in the integration of curricula;

- some funding is needed to support professional and curriculum development activities;
- strong leadership is needed to break down the significant barriers that often exist between vocational and academic programs;
- it takes time to restructure the curriculum—five years of effort may be a realistic minimum;
- curriculum integration should not focus solely on "high technology" vocational programs, since many of the students who are least successful with academic work are enrolled in traditional vocational programs; and
- educational and cognitive research has not addressed the potential value of teaching academics in a vocational setting."

Commission Recommends Integration

A Preliminary Report of the Maryland Vocational-Technical Education Commission recommends academic and vocational-technical education be integrated into a single system. The Commission, which was established to study and make recommendations on the future direction of vocational-technical education, reached the central conclusion that "fixing" the present system is not the answer. Rather, the Commission reported:

"The present system was designed for a world that no longer exists. The global economy dictates new standards of performance. Demographic shifts and new family patterns require more flexible and effective educational technology. We must structure a revolutionary new educational system that integrates "vocational" and "academic" education into a single system. We must also develop a new management process to direct this new system and insure that it produces world class results and is self-correcting and flexible.

This system should not strive for evolutionary improvement. It must strive for revolutionary gains. By the year 2000,

- the drop-out rate prior to graduation should be reduced from today's 23 percent to less than one percent;
- *every* student should graduate with a marketable skill;
- *every* student should be technologically literate, able to communicate, solve problems, work with others in groups, learn new information quickly, and apply it effectively;
- *every* student should have an individual learning plan which contains a "destination" following secondary school and insures that each student has the necessary preparation to reach this objective.

These are some of the outcomes that the educational revolution should produce in Maryland. Anything that sets lower goals is not responding to the challenge."

Federal Legislation May Require Integration

If the House of Representatives version of new legislation prevails, program integration will be required. House Bill 7, recently passed unanimously by the House of Representatives to reauthorize the Carl D. Perkins Vocational Education Act, limits Federal funding to local programs which integrate academic and occupational disciplines and which lead to both academic and occupational competence. This provision was incorporated in response to numerous requests received from business and industry for a larger pool of individuals with a more balanced educational background that includes both vocational and academic skills. House Bill 7 also requires each State receiving federal funds to review the programs assisted under the Act to determine whether academic and occupational programs are being coordinated in such a way as to benefit students, and whether both academic and occupational competencies are acquired by students.

A Conceptual Model

A concept for the establishment of a special program school recently developed by a Maryland school system provides an example of the manner in which the State Council believes program integration may be achieved. The conceptual model proposes offerings which will respond to the interests and needs of all segments of the student population. A college preparatory program for students planning to attend colleges and universities to prepare for careers in engineering, science, or other fields; articulated two-plus-two (two years in secondary school plus two years in community college) technical preparation programs to respond to the interests of students planning technical careers; and career entry programs for those students planning to take full-time employment following graduation from high school. Students enrolled in each curriculum offered would have access to a wide range of regular and advanced placement academic and vocational courses relevant to their interests and aptitudes. All curricula would be designed to provide students a quality well-rounded education.

Benefits and Barriers

Dr. Charles Benson, Director, The National Center for Research in Vocational Education, recently addressed the following issues in testimony presented to the Senate Subcommittee on Education, Arts, and Humanities.

"Common observation suggests that a significant proportion of American high school students, largely uncounseled, graze over the field of the less-demanding offerings, taking some courses from the general track, together with an odd assortment of very basic vocational study. On the one hand, these assortments of courses lack focus and coherence; on the other hand; these diverse and undemanding programs yield a set of graduates and school leavers who are intellectually illiterate. This is bad for the econ-

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omy, but it is even worse for these cohorts of young people themselves. To be denied help—or to be distracted away from help—in fully developing one's mind is a cruel insult to a person's self-respect and fulfillment. It may be an exaggeration or a pious hope to say that we can overcome this form of social injustice by integrating academic and vocational education, but in my strong opinion, it's the best show we have. Better to take the direct approach, be it a leap of faith, then to try to fine-tune an educational system that has broken down.

The other side of the coin is that the college-preparatory students, in all too many cases, have an immense gap in their own knowledge, in that they acquire no familiarity with technological processes—"how things work." Such knowledge is an integral component of liberal education."

"A key question is whether vocational and academic education can be integrated successfully. Based on the experiences of the schools that have tried to do so, there are many difficulties to be faced in the process of implementing this reform. *Such integration will not be easy, and it will not be achieved simply by federal mandate.*

Among the most serious barriers to be overcome are the following:

- *Lack of well-established models of integration.* There is a paucity of information on what meaningful integration of vocational and academic education means. Some teachers may feel they are doing it already when they are not; some administrators may feel that the fact that vocational students take courses in the general track provides sufficient integration. The concept of integration is distressingly easy to trivialize. Information in the hands of administrators and teachers about successful examples of integration would help reduce this possibility. Many successful examples are in early stages of development, and even the older programs are not as thoroughly developed as one might wish. In any case, there is no dissemination network on integrating vocational and academic studies, and hardly any constituency.
- *New demands on teacher time.* In almost any form, integration requires time for teachers to develop new curricula and to adapt available curricula. In addition, the most promising approaches to integration seem to be those in which vocational and academic teachers work together to develop curricula, plan courses, and jointly prepare materials for instruction.
- *Lack of resources for staff development.* The schools which have tried integration have found both academic and vocational teachers in need of retraining: some vocational teachers need to master academic material they may never have learned, and academic teachers need to learn about vocational material and about the world of occupations which they may never have entered.
- *The need for consistent support of efforts at integration.* Schools which have developed new approaches to vocational education have sometimes come into conflict with state policy and state agencies. Reforms therefore require either the support of state agencies, or local creativity in getting around state requirements.
- *The absence of appropriate instruments of assessment.* As I commented earlier, integration can take a number of different forms. Some of these forms may be highly effective with some students, but these same types of integration may not be useful for students with other characteristics. One cannot necessarily expect that "one size will fit all." It would be extremely useful to be able to assess accurately the results of using different kinds of curricula with different types of students. But we need more than findings from standardized test instruments now available.
- *An incomplete grounding in cognitive science.* The research in cognitive science that bears upon the integration of vocational and academic studies is not generally based on investigations of teaching practices and learning styles in secondary schools. Most of the research deals with training the military, work skills acquisition by illiterate apprentices in the Third World, and out-of-school skills training in the U.S. There is not yet a body of research that examines alternative forms of integration in the secondary school setting and assesses the effects of integration on diverse groups of secondary students.

(Source: Oral Testimony of Dr. Charles Benson before Senate Subcommittee on Education, Arts, and Humanities, July 17, 1989.)

Arguments of Skeptics

Ellen Summerfield, Principal, Chicago High School for Agricultural Sciences, included the following comments in a paper presented to the National Assessment of Vocational Education.

"The debate centers on academic versus vocational education. The Chicago High School for Agricultural Sciences has a college preparatory vocational program. We do both at our school—we require students to take all of the courses required for college admission and all of the agricultural science courses. Our students are required to take:

- Three years of mathematics;
- Three years of laboratory science;
- Four years of English;
- Three years of social studies;
- Two years of foreign language and culture; and
- One year of computer science.

In addition, students are exposed to the agricultural sciences in all four years.

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When we recruit new students, parents ask, "This isn't a vocational program, is it?" I tell them that our program is college prep and includes hands-on experiences in agribusiness and agriscience.

There are those who say that a student must follow a track—college prep, regular, or vocational. We have proven that all students can succeed in a program that integrates academic and vocational subjects. Academic and occupational education can and should complement one another. The skeptics have arguments ready to prove us wrong:

1. The first argument says there is not time in the school day to do both. A student must make a choice between academic and vocational courses. I say that is untrue. Without lengthening the school day, and without violating the teachers' union contract, we have fit in all of the courses. How did we do it? By shortening the lunch period to 30 minutes and eliminating study halls.
2. The second argument says that if you require low-ability students to take academic (or college prep) courses, you will force them to drop out of school. Again, I say, not true. Over 500 students applied for admission to our school for the 120 freshman places last year. It was tempting to choose only the high-ability, college-bound youngsters. However, magnet schools have been accused of being elitist and skimming the talent and, as a result, causing the general high schools to become mediocre. I did not want to open our school the first year with charges of elitism. Also, I was curious to see what would happen if our students were representative of all ability levels.

Therefore, one-fifth of those we selected were talents, above national norms in reading and math, and college bound. One-fifth were below national norms, many with learning disabilities or limited proficiency in English. And the remaining three-fifths were average students willing to work hard.

Eighty-five percent of the students were minorities and 59 percent were female.

How did these students do after one year in the program? They did very well. Our attendance rate was the highest in the city at 94 percent. This is quite an accomplishment since many of these students travel an hour and a half on public transportation each way to school. More significant, our failure rate was lower than that of any of the other high schools in the city.

The low-ability students did well—while few of them received A's in their courses, they managed to pass, despite the heavy course load they had as freshmen. Several parents came in to tell me that their children had never done so well in school. One mom is working to have the educable mentally retarded designation removed from her daughter's records because the child successfully completed algebra, computer science, English, and all the other courses required of freshmen.

Did we lower our standards? Did we water down the courses? No. We raised our expectations and the students stretched and reached to meet them. All of the students were expected to succeed, whether they were in the top fifth, the average three-fifths, or in the lowest fifth of the class.

We in education often use numbers in ways that hurt kids. We say that most students in high school will not go on to college, and of those who do go on, many will not complete the baccalaureate degree. This gives us an out—a reason to offer TRAINING rather than EDUCATION.

Education opens doors, exposes students to possibilities—it should not limit a student. Kids who are victims of tracking systems are shortchanged. If students in a vocational track decide several years after high school graduation to pursue some type of postsecondary education, they find themselves lacking the courses needed for college admission.

The debate continues. There are those who insist we must decide to do one or the other:

- Have an academic curriculum that prepares students for college; or
- Have a vocational curriculum that prepares students for jobs.

I believe high schools should prepare students for college and for jobs. More importantly, high schools should prepare students for life. If a youngster never pursues any formal education beyond high school, isn't it that much more important for us to offer all we can?

People will need scientific understandings, math skills, knowledge of history and geography, language and culture, computer literacy, and communication skills in order to survive in the 21st century. Low-ability students are not harmed by taking academic courses. They are not damaged by too much math, science, or social studies.

(Source: National Assessment of Vocational Education, Design Papers, dated February 1987, U.S. Department of Education.)

Implications of Integration

A study of the case for integrating academic and vocational education was recently conducted by Policy Studies Associates, Inc. for the National Assessment of Vocational Education. The study findings and implications were reported as follows:

Overall, innovative efforts to achieve a new relationship and closer alignment between vocational and academic curriculum and instruction appear to be a highly promising trend for secondary education. The task, however, is both

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complex and difficult if it is to be done well. Among our primary findings are the following:

- Curriculum development and professional development are the key activities associated with implementing an integrated vocational/academic curriculum.
- It is preferable to have both academic and vocational instructors involved in the innovation from the start.
- Some funding is needed to support professional and curriculum development activities.
- There are often significant social, intellectual, and even physical barriers between the vocational and academic staff in a high school that must be breached in order to make curriculum integration work. It is in this area, in particular, that strong leadership is needed.
- Restructuring the relationship between academic and vocational education takes a long time; five years is probably a realistic minimum timeframe.
- In most cases, evaluation is a weak component in program design and implementation. It is therefore difficult to determine how much impact an applied approach to academics has had on student achievement. There is anecdotal evidence that applied curricula seem to stimulate students to become more engaged in classroom academic tasks.
- There appears to be some danger that expansion of curriculum integration efforts will focus heavily on "high tech" vocational programs to the exclusion of more traditional vocational education departments. This would be unfortunate since many of the students who are the most disaffected from their academic work are enrolled in traditional vocational programs.
- Mainstream educational and cognitive research has not addressed the potential value of teaching academics in a vocational setting.

The Need for Research—Efforts to integrate or align academic and vocational curricula represent an exciting but still emerging educational trend that should be taken very seriously. It is not now and should not become a strictly vocational movement since it requires the cooperation of both academic and vocational educators. In the long run, it will be important for mainstream educational and psychological researchers to undertake carefully controlled studies of what and how high school students learn in applied contexts. Currently, cognitive research focuses on learning in traditional academic classrooms and on the job, thus leapfrogging over the one place in high schools where the workplace in simulated. Since the mainstream research community has tended to either ignore or denigrate vocational education, care must be taken to ensure that such studies begin from a neutral position, allowing the possibility that applied academics may be the preferred approach for some students.

A New Role for Vocational Education—One of the most positive outcomes of efforts to integrate vocational and academic curricula is a new respect for vocational education as part of the solution rather than part of the problem. While both academic and vocational teachers must participate in order to make a new approach work it is particularly significant that vocational educators in several of the sites visited have assumed a leadership role in conceptualizing, planning and implementing a new relationship between vocational and academic curriculum and instruction. This appears to signal both a new assertiveness and a retreat from defensiveness on the part of at least some vocational educators. Furthermore, given new emphasis on coordinating "basic skills" instruction with pre-employment or job training that appears in several pieces of federal legislation (e.g., JTPA and the new Part C of the Chapter 1 legislation), the experiences of vocational educators in creating innovative approaches to curriculum integration may become an important resource for a much broader spectrum of efforts to improve education for "the forgotten half."

The Importance of Time—In taking steps to encourage new relationships between academic and vocational education, policymakers should not underestimate the amount of time required to restructure firmly entrenched attitudes and behaviors. Standard three-year funding cycles, for example, may only carry such an innovation through planning and early implementation. Certainly three years is not long enough for accumulation of definitive student outcome data if a program covers all four years of high school. Nor does it allow time for the inevitable mid-course corrections associated with trekking in uncharted territory. In this context, both innovators and funders should have a mutual understanding of a realistic timeframe and appropriate milestones in order to give such experiments a fair chance to develop.

Evaluation and Assessment—Schools and school districts that are or will be experimenting with integrating vocational and academic education need expert assistance in identifying or developing appropriate instruments for student assessment and in designing rigorous program evaluation plans. There is probably no sense in pursuing a difficult task like aligning vocational/academic curriculum and instruction unless it can be demonstrated to make a significant difference in student learning. In order to accomplish this, serious thought must be given to the types of assessment that can best measure mastery of academic learning in an applied context. Furthermore, innovative programs should be conducting formative evaluations on a regular basis in order to make adjustments in content or approach as needed. The National Center for Research in Vocational Education (NCRVE) seems to be a logical choice to coordinate assistance in this area.

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Governor's Commission on School Performance

The Report of the Governor's Commission on School Performance includes a recommendation for the "Establishment of a statewide school improvement program directed and supported by a high-level unit in the Maryland State Department of Education devoted solely to school improvement." The Report further states that the responsibilities of such a high level school improvement unit should be.

- "To identify and disseminate exemplary programs, practices and staff training models that have produced outstanding students results.
- To provide direct assistance to schools and school systems when necessary to develop and carry out their assessment programs.
- When necessary, to help schools and school systems make improvement plans and carry them out.
- To offer staff training and other support to schools with needs.

To demonstrate the most effective current practices and to provide high-quality training for teachers and administrators by some of the state's most able educators, the Maryland State Department of Education should designate a network of schools to serve as professional training centers.

The activities described above should be jointly planned and financed by the Maryland State Department of Education and local school systems. They must be designed to keep school staffs throughout the state fully informed about what works."

Recognition of Need to Integrate

The need to seriously consider the integration of academic and vocational education has recently been highlighted by:

- House of Representatives Bill, H.R.7 on Reauthorization of the Carl. D. Perkins Vocational Education Act.
- National Assessment of Vocational Education
- National Center for Research in Vocational Education
- Southern Regional Education Board
- Maryland Vocational-Technical Education Commission
- Hearings before Senate Subcommittee on Education, Arts, and Humanities.

The State Council on Vocational-Technical Education believes the establishment of a pilot program to integrate academic and vocational-technical education may provide a means of determining the manner and extent to which this innovative approach to school improvment should be pursued in Maryland.